PostScript

LETTERS

What to do with outliers?

The paper by Spiegelhalter is a valuable contribution to the literature on presenting and displaying performance related outcome measures.[1] It provides further methodological guidance on identifying service providers whose performance falls outside control limits using funnel plot methodology. When reporting on performance it is important to have procedures in place which should be followed when outliers are identified. These issues have been considered by the Paediatric Intensive Care Audit Network (PICANet) who use the funnel plot methodology for reporting risk adjusted mortality from all paediatric intensive care units (PICU) in England and Wales. Before producing these funnel plots for the latest national report, we issued a policy statement drawn up in consultation with both our Clinical Advisory and Steering Groups.[2] In summary, the PICANet policy (published in full at http://www.picanet.org.uk) recognises that a PICU whose risk adjusted mortality lies outside the control limits will be identified as having returned data that are markedly different from other PICUs. It is important to note that this is not sufficient evidence to suggest that it has either markedly higher or lower mortality than other PICUs, but merely that the data it has returned are different from those of other PICUs. To resolve why these data are different, PICANet will work with the units to provide a satisfactory explanation using the following plan.

(1) Review the data to investigate whether there are data driven reasons for a PICU lying outside the control limits (it is known that risk adjustment tools can be unreliable when a PICU has a particularly high proportion of patients at either end of the bounds of the tool).

(2) Review the quality of data supplied by the PICU. The quality of the data is the PICU's responsibility. PICANet will provide feedback from PICU data validation visits and central validation procedures. PICUs will be expected to check the quality of individual data items.

(3) Plot the data quality indicators over time to identify whether the anomaly can be traced to a certain data collection period.

(4) Plot the mortality ratio over time to identify whether the anomaly can be traced to a certain data collection period.

(5) Plot the observed mortality over time to identify whether the anomaly can be traced to a certain data collection period.

(6) Plot the expected mortality over time to identify whether the anomaly can be traced to a certain data collection period.

(7) Investigate the primary diagnoses for admissions to the PICU. If the PICU has a very different diagnostic case mix than other PICUs, this may suggest that further refinements to the risk adjustment method are required.

(8) Produce a brief summary report of the above for the lead clinician and Chief Executive at the PICU concerned together with an invitation to meet in person to review the data with the PICANet team.

We believe that having such a policy in place, clearly outlining our interpretation and proposed actions before publication of such funnel plots, is vital to the chances of such information being accepted by staff at the participating units and thus more likely to result in positive actions being taken.

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Making the case for more necropsies to improve patient care

In their recent study Shojania *et al*[1] highlight the importance of necropsy to clinical care by demonstrating how diagnostic sensitivity for three conditions is overestimated without necropsy results. This study prompted an editorial by Guly calling for more research to show that increasing necropsy rates can improve patient care.[2]

Clearly, the evidence establishing the value of necropsy for identifying diagnostic and management issues relevant to patient care[3] is not preventing the international decline in the number of hospital necropsies. We therefore support Guly's petition for more evidence and describe our efforts to improve communication between pathologists and clinicians to facilitate such research.

At the Victorian Institute of Forensic Medicine, forensic necropsies are conducted on approximately 80% of hospital deaths investigated by the Coroner's Office in Victoria, Australia.[4] A significant barrier to using the lessons of forensic necropsy for the improvement of clinical care is the lack of communication channels between Coroners and clinicians. The Clinical Liaison Service, which is the medical investigation unit assisting the State Coroner's Office in Victoria, attempts to bridge the gap between Coroners and clinicians.

Established in 2002, the Clinical Liaison Service reviews the hospital care of the deaths reported to the Coroner. This unit developed a standardised review process that integrates the necropsy results with the review of medical records to identify potential system failures in clinical practice. The review process includes a multidisciplinary discussion with a Coroner, forensic pathologist, clinicians and coronial staff to determine which issues, if any, should be investigated further for the goal of system improvement and death prevention. Approximately 2000 hospital deaths have been reviewed by the Clinical Liaison Service and 25% of these have undergone review at the multidisciplinary discussion.

At the conclusion of the investigation the Coroner makes a formal legal finding that includes the issues of concern and recommendations to improve healthcare practice. As the Coroner's recommendations are not always widely distributed,[5] the Clinical Liaison Service provides feedback to hospital staff to improve health professionals' understanding of cases with patient safety implications. This feedback includes face to face presentations and a synopsis of noteworthy cases in the unit's quarterly publication the Coronial Communiqué.[6]

As the work by Shojania *et al* shows, necropsy results have the capacity to impact on clinical practice far more broadly than at the individual case level alone. In Victoria a national database, the National Coroners' Information System (NCIS), has been established to provide a national repository of information about each Coroner's case including the forensic necropsy report.

It is vital that health researchers and clinicians consider the lessons from necropsy results in individual cases as well as in an aggregated form. Furthermore, their resulting information must be communicated widely or many valuable lessons may be overlooked.

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